Math 180, Calculus I   **Hour Exam Two**

9:00 am Lecture   **November 3, 1995**

1. The function $f(x)$ is increasing. Some of its values are given in the table:

x	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5
$f(x)$	1.0	1.2	1.6	2.0	2.4	2.6	3.2	3.4

   (i) Compute the left and right Riemann sums with two subdivisions ($n = 2$) for the integral
$$\int_1^2 f(x)\,dx.$$

   (ii) How do these sums compare with the value of the integral?

2. Find the derivatives of the following functions. Please do *not* simplify your answers.

   (i) $x^{1642} - 2x^5 + x^{1/3} + \pi$

   (ii) $\dfrac{x}{x^3 + 1}$

   (iii) $e^{-x}\sin x$

3. (i) Find a function whose derivative is $3x^2 + 1$.

   (ii) Evaluate: $\displaystyle\int_1^b (3x^2 + 1)\,dx$.

4. The temperature of a pie in a $325°$ oven is given by
$$f(t) = 325 - 255e^{-0.1t}$$

   where t is the time (in minutes) the pie has been in the oven.

   (i) Write a formula using an integral for the average temperature of the pie during the first 30 minutes, $0 \le t \le 30$.

   (ii) Calculate this average temperature with an error of at most $5°$.

5. For the curve $x^2 + 3y + y^2 = 19$,

   (i) Find $\dfrac{dy}{dx}$ in terms of x and y.

   (ii) Write the equation of the tangent line at the point $(1, 3)$.

6. Differentiate the following functions and show your work.

   (i) $\ln(x + x^3)$

   (ii) $e^{\cos(\sqrt{x})}$

   (iii) $\tan(3x - 2)$.